

Energy Services **BULLETIN**

Western's monthly energy efficiency and renewable energy newsletter dedicated to customer activities and sharing information on energy services.

San Francisco Bay Area utility turns food scraps into energy

With its long history of turning one man's trash into another man's... energy, East Bay Municipal Utility District (EBMUD) has embarked on a new project to turn food waste into power.

Believed to be the first of its kind in the United States, the project collects food scraps from about 2,300 restaurants and grocery stores in San Francisco's East Bay area. Instead of going to a landfill, the food goes into large tanks at the utility district's Oakland plant, where microbes speed up decomposition. The methane released from the decomposing food fires a turbine to generate electricity.

EPA funds study

The food-to-energy project began in 2006, when the U.S.

Environmental Protection Agency (EPA) teamed with the utility to study the benefits and limitations of anaerobically digesting food waste. One of the least recovered materials in the municipal solid waste stream, according to the EPA, decomposing food releases the potent greenhouse gas methane into the atmosphere.

With a \$50,000 grant from EPA, EBMUD engineers operated two 30-liter bench-scale digesters to test and refine the process. About 40 tons of food, collected by waste haulers, goes into a "juicer" that separates contaminants like silverware and plastic bags, and grinds the waste to a homogenous pulp. The liquid is then pumped into digestive tanks, where it releases the biogas that is piped into on-site generators. After about 20 days in the digestive tanks, the food waste is composted.

So far, the system is powering EBMUD's wastewater treatment plant, which has been converting waste to energy since 1983. "We are still in the pilot phase of the



Anaerobic digesters at EBMUD Wastewater Treatment Plant turn food waste into energy. (Photo by EBMUD)

project," said Senior Public Affairs Representative Charles Hardy, "but in the next six months or so, we anticipate being able to sell electricity back to the grid."

Putting it together

Over the next several months, EBMUD will be putting in place the infrastructure it will need to realize its eventual goal of selling to Pacific Gas & Electric.

The San Francisco waste collection company Recology has contracted to build a food-handling facility on land EBMUD owns adjacent to the Oakland water treatment plant. During the pilot phase, an interim facility in Vacaville has handled the food scraps.

EBMUD is also adding a new turbine engine to the fleet that

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Food scraps *from page 1*

processes the gas from wastewater treatment. The new engine is more efficient than previous models, so it will be able to take advantage of the larger quantities of gas food scraps produce, as well as some of the excess production from wastewater treatment. “Depending on the time of year, we produce more gas than we can use and have to flare it,” said Hardy.

Flaring may become a thing of the past, since it takes about 100 tons of scraps per day to produce enough gas to generate one megawatt. Currently, the plant processes about 100 tons per week. Even if EBMUD fulfills its plans to process 200 tons of food waste a day, that’s less than 10 percent of the available supply. Commercial enterprises in the region generate 1,800 tons of food scraps daily—enough to provide power for more than 25,000 homes.

Energy Services Bulletin

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Editor: Kevon Storie
Designer: Grant Kuhn

User-friendly program

About half of the area food businesses have partnered with the East Bay utility so far, noted Hardy. “The restaurants are doing a great thing for us that also lets them feel good about doing right by the community and the environment,” he said. “We make an effort to keep the costs down so participation doesn’t cost them.”

The Central Contra Costa Solid Waste Authority was heavily involved with recruiting restaurants to participate in the project. The district, formed to handle garbage contracts for six Bay Area communities, works with a garbage hauler to send food scraps to the East Bay utility for recycling.

Waste haulers, who pay the utility district to take the waste, collect the food scraps from restaurants and hotels as part of their normal garbage pickups. Some of the haulers weed out big items, such as cardboard boxes used for produce, while some participating businesses do more of the separation. Haulers have been very helpful with educating restaurant and grocery workers on keeping non-food refuse out of the waste stream. Contaminants like plastic utensils and bags can clog pipes, should they get to the plant.

Recycling habit

The collection process has been a learning curve for everyone involved, Hardy admitted. “Remember, it took the country as a whole a long time to get used to the idea of recycling,” he said.

Luckily, restaurants are one of the

greenest industry sectors, he added, with many on the lookout for more sustainable ways to do business.

“The participants have been extremely cooperative and open to learning the system that may help them ultimately keep down their disposal costs,” said Hardy.

It doesn’t hurt the project that the Bay Area has a long-established recycling program, including voluntary food scrap recycling since 2001. A San Francisco city ordinance took effect Oct. 21 requiring almost every residence and business to have three color-coded bins for waste: blue for recycling, green for compost and black for trash. Residents receive composting bins at no extra cost from Recology.

Residential food scraps are mostly composted, and will continue to be for the time being, said Hardy. “The challenges of collecting and separating the residential waste stream are just tremendous,” he admitted. “But I believe we’ll go there one day.”

In the meantime, the first commercial methane digester for food waste is getting closer to creating energy and valuable fertilizer, while reducing landfill waste and greenhouse gases. Waste-to-energy is not the silver bullet for the nation’s energy problems, but EBMUD’s project could inspire communities to change the way they look at trash. ⚡

Want to know more?

Visit www.wapa.gov/es/pubs/esb/2010/apr/apr101.htm

OPPD offers online energy-efficiency video library

Thanks to the Internet, your customers expect to be able to get information about your products and services instantly, and at their convenience. One service that cyberspace is good at delivering is customer education, as Omaha Public Power District (OPPD) proved when it moved its popular residential energy-efficiency classes online.

The Energy-Efficiency Video Library is part of OPPD's Aim Green program to provide customers with planet-friendly ideas for saving energy and increasing sustainability. The videos cover material that OPPD used to present in a classroom setting.

Convenient classes

The videos available online include:

- Top 10 List of Energy Efficiency Tips
- How to Reduce Home Lighting Costs
- Preventing Phantom Energy Use by Home Electronics and Appliances
- Energy-Efficiency for the Home Water Heater
- Benefits of Heat Pumps

"We picked the classes that were getting the most participation and made those into our first videos," said OPPD Senior Media Specialist Mike Jones.

Of the many good reasons for putting energy education online, Jones explained, customer service was the primary driver. "The videos are there 24/7—people don't have to wait for a particular class to be scheduled, drive across town to attend it or miss the class because something else came up," he said. "Watching a video is less time-consuming than taking a class,

and users can go back over the material as many times as they need to without feeling like they are slowing the class down."

Customers with specific questions about a topic, or with questions that require more in-depth discussion are still able to contact OPPD's energy advisors. The power district will also continue to offer its professional series of classes, open to real estate professionals, engineers and architects, and approved for continuing education credits.

Company-wide support

The funding for putting the classes on video came primarily from OPPD's outreach budget. Offering consumer education online will eventually yield a cost saving over maintaining a classroom in a separate facility. OPPD employees who taught the classes have been freed up to focus on other tasks.

But the main selling point, said Jones, was always that the video library is the most effective way to reach the most customers with OPPD's energy-efficiency message. "We had to make the business case for the online library to senior management, but ultimately, they were supportive," he recalled.

The IT department had to be on board as well, before the library could



OPPD's Weatherization video shows consumers how to identify and seal air leaks, one of the most cost-effective energy-efficiency measures homeowners can do. (Photo by Omaha Public Power District)

go online. A Web site must have a certain amount of bandwidth to be able to feed videos smoothly. "That was one of the first questions we asked, but the IT department assured us that it wouldn't be a problem," recalled Jones.

Producing, promoting

Turning the classes into videos was the next step in creating the video library. As a starting point, OPPD used a series of educational videos developed by the Nebraska Energy Assistance Network (NEAN). NEAN, a partnership of utilities, government agencies, regulators and others, had produced the series with input from its members to address the energy needs of Nebraska consumers. OPPD's staff of energy solution experts revised and refined the original scripts, based on the classroom material most requested by customers.

Working through its advertising agency, OPPD contracted with a professional production house and hired a local actor, Jonathan Rone, to

See VIDEO LIBRARY page 7

Western invites customers to join 2010 REC solicitation

Federal agencies and firm power customers looking to obtain the benefits of renewable energy still have time to be included in Western's 2010 renewable energy certificate (REC) solicitation—if they act now. The deadline for participants to submit a Statement of Intent (SOI) to participate in the solicitation is April 30.

Western's Renewable Resources for Federal Agencies program and the Federal Energy Management Program (FEMP) work together to provide Federal agencies with a streamlined and cost-effective process for acquiring RECs. The annual solicitation aggregates the specific requirements of all the participants, except for price considerations. Western then requests and reviews proposals from vendors to find the products that best meet the needs specified in the interagency agreements each participating agency signed. FEMP may cover some of the administrative costs for the acquisition, saving the participants money.

Pros, cons of RECs

The Energy Policy Act of 2005 and Executive Order 13423 (EPA Act 2005/EO 13423) mandated Federal agencies to receive 3 percent of their electricity from renewable resources by fiscal year 2007, 5 percent by FY2010 and 7.5 percent by FY2013. Renewable energy is electricity from solar, wind, biomass, landfill gas, ocean, geothermal or municipal solid waste. New hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project also qualifies.

Many facilities may not be able

to receive electricity directly from renewable plants because of location, existing power contracts or other factors. These Federal agencies can also meet their obligations by purchasing the environmental attributes of power generated from renewable resources—RECs. Certified and verified as green, RECs can be delivered to any location and do not effect a facility's existing utility bill. An aggregate purchase can also cover multiple facilities.

Unlike renewable energy, RECs do not protect a customer from volatile energy prices. Purchasing RECs does not guarantee the physical integration of renewable energy into an agency's local power supply system.

What SOI says

Joining in Western's 2010 REC purchase is relatively simple. Agencies submit a completed SOI to Western by close of business April 30, 2010. SOIs are a good faith non-binding agreement authorizing Western to seek RECs on an agency's behalf. There is an SOI for Federal Agencies (75 kb Word doc) and one for Western preference customers (75 kb Word doc), each specifying:

- Renewable product desired
- Quantity
- Location



With Western's assistance, Ft. Carson Army Base in Colorado built a 2-MW solar array on a decommissioned landfill at the base.

- Maximum price
- Time frame of the agreement

Some agencies involved in past solicitations had price limitations which they specified in their SOIs. If your agency doesn't have a limitation, it is not necessary to put a value in; however, Western must know how many RECs an agency wants to purchase. The prices participants request are not guaranteed, but merely provide a ballpark figure to use for evaluating proposals.

Contracts can accommodate RECs for multiple years as specified in the SOI—Western has written contracts for up to five years.

Purchase timetable

Once SOIs are signed, Western will produce Interagency Agreements (IA) by May 31, and issue a request for proposals (RFP) on or about June 1. Proposals will be due to Western by Aug. 2, 2010.

Western will rank and rate the proposals to determine if they meet each

See REC SOLICITATION page 7

Technology Spotlight:

Hybrid Evaporative/DX Compressor Air Conditioners

The efficiency of standard, direct-expansion (DX) compressor-based air conditioners can decline sharply as outdoor temperature increases. In contrast, the efficiency of air conditioners using evaporative cooling increases as outdoor temperature increases. Hybrid systems that make use of both types of cooling, switching between them based on outdoor temperature, can increase overall efficiency significantly. Such hybrids are often used in larger commercial-scale applications, but until recently have not been available in a size with features suitable for residential and small commercial buildings.

Where hybrids work best

Evaporative cooling technology takes advantage of the fact that when water evaporates it cools the surrounding air. Evaporative cooling can be accomplished directly or indirectly. In direct evaporative coolers (“swamp coolers”), moisture is evaporated directly into the air supplied to the conditioned space. This cools the air but also increases the humidity. In indirect systems, moisture is evaporated into a second air stream, which is then used to cool supply air to the space via a heat exchanger.

Indirect evaporative cooling has lower efficiency than direct cooling, but avoids the high, uncomfortable humidity that can occur with direct evaporative cooling. Commercially available hybrid evaporative/DX

compressor systems generally use indirect evaporative cooling, with some units providing a second stage of direct evaporative cooling.

While direct evaporative cooling is only practical in dry climates, hybrid indirect evaporative/DX systems can be used over a wider range of climate zones. During hot, humid weather, evaporative cooling must be supplemented by compressor-based cooling. Even with the addition of compressor-based cooling, the technology is still most effective in dry climates. One of the first steps in deciding if this type of system is a good fit for a specific project is to determine if the local climate is suitable for indirect evaporative cooling. A color-coded performance table from Coolerado shows the ability of the manufacturer’s five-ton hybrid unit to meet comfort conditions in locations throughout the world.

Increased efficiency

The increased efficiency of hybrid indirect evaporative/DX systems compared to conventional systems can be significant, but varies widely depending on the application and location. Generally, in hot dry climates, the systems can reduce cooling power demand by up to 80 percent and cooling energy use by as much as 70 percent.

A study by the National Renewable Energy Laboratory found that the Coolerado’s five-ton rooftop hybrid air conditioner has an energy efficiency ratio (EER) of 21.7 at 105°F and 25 percent

relative humidity. At 90°F and 25 percent relative humidity the unit has an EER of 15.8. As a point of reference, similarly sized light commercial air conditioners must have a minimum rated EER of 11 to qualify for an Energy Star label.

Water use

Water use by evaporative coolers is a point of concern, especially since this technology is most energy-efficient in dry climates. However, from the conservation standpoint, keep in mind that water is also used in making electricity.

Nevertheless, it is important to consider the cost of water use when choosing the equipment and calculating the payback. Water consumption varies, but typically ranges from 2 to 6 gallons per hour per ton of cooling. A modern evaporative cooler in a typical home in the Southwest United States would likely increase water use about 3 percent averaged over the year—small compared to typical water use for other needs. In many cases, electricity cost savings can offset the increase in water costs.

O&M

Evaporative cooling systems require special routine maintenance in addition to what is normally required for standard air conditioners. Those tasks may include periodic water filter cleaning or replacement, an annual drain-down and dry-out (winterization) and a spring tune-up prior to the cooling season.

See TECHNOLOGY SPOTLIGHT page 8

Web site of the month:

Buy Clean Energy Now

In honor of the 40th anniversary of Earth Day, April 22, energy-related organizations as diverse as Xcel Energy, the Environmental and Energy Study Institute and Western, have teamed up to support a year-long campaign to encourage consumers to Buy Clean Energy Now.

Targeting individuals and businesses alike, the campaign's ambitious goal is to see 1 billion kilowatt-hours of renewable energy purchased in 2010.

Making the case

Designed by the nonprofit Center for Resource Solutions and Green-e, the Web site first explains why clean energy is important. The facts and statistics on this page are not only helpful to consumers, but also to utility professionals who need to make the case for adding renewables to their power portfolios.

Users will find an Energy Information Administration (EIA) pie chart showing that the nation's power mix comes largely from coal-fired plants. Emissions data from the U.S. Environmental Protection Agency make it clear that burning coal has serious consequences for public health.

There is also information here about how developing our renewable energy potential could benefit the economy. Projections for jobs, economic development and environmental health come from studies by the EIA and the Union of Concerned Scientists.

Learn, buy, share

Most visitors will come to Buy Clean Energy Now because they are ready to take action, and the Web site provides consumers with three simple steps to make a difference.

Step 1: Learn

Energy efficiency always comes first, before installing a renewable energy system or purchasing renewable energy, so the first step visitors must take is to read their utility bills. This page tells how to figure out how much energy a household uses annually, offers a few easy tips for conserving electricity and links to the EIA's frequently asked questions about electricity use in the United States.

Step 2: Buy

After visitors have determined how much electricity they use in a year, they are ready to buy clean energy. The database searches by zip code to find a local utility that offers a green power purchasing program. If there are none in the area, visitors can buy renewable energy certificates (RECs) from one of the campaign's participating vendors. The RECs are all priced the same and are certified through Green-e Energy.



A new campaign and Web site make it easy for consumers and businesses to reduce the impact of their electricity use. (Artwork by Buy Clean Energy Now)

Step 3: Share

As the final step, the Web site has a page where participants tell the world that they are buying clean energy, and share their reasons for taking action. There is a place for both residential and commercial consumers to post testimonials.

For utilities, too!

The audience for Buy Clean Energy Now is primarily consumers, but utilities are welcomed to participate. Sponsorships are available at several levels, and sponsors receive recognition on the Web site and in campaign news.

Power providers don't need to sponsor the campaign to spread the word, though. Smaller utilities and municipalities without green power programs can use Buy Clean Energy Now as a way to offer their customers a green power option. Place a link to the campaign on your Web site, or mention it in your bill stuffers.

Increasing the demand for renewable generation is a critical step toward bringing down costs and resolving technical issues, like storage and transmission. It won't happen overnight, but consumers who Buy Clean Energy Now are taking steps to move us closer to that future everyday. ⚡

Want to know more?

Visit www.wapa.gov/es/pubs/esb/2010/apr/apr105.htm

Video library *from page 3*

present the material. "If customers were going to sit through the videos, and watch them repeatedly, they had to be good quality," said Jones.

The videos were placed online Jan. 1 with little in the way of fanfare, a "soft" premier, as they say in show business. "We wanted to make sure that everything worked technically before we started inviting our customers to use the library," said Jones.

Promotion began heavily about a week later with news releases, bill inserts and a story in the customer newsletter. Local media interviewed OPPD about the new service, and the utility's call center staff suggested that customers with related questions check out the library. "Once we began promoting

it, the site went from six hits per day to 75 and we started receiving calls not just from our customers but from around the country," said Jones.

Creating dialogue

The response has been very favorable, he added, noting that OPPD customers have been very receptive to new forms of communication. The utility's corporate communications department and call center recently started using social media to communicate with customers. "It's a learning curve to figure out the best uses for these tools," Jones acknowledged.

Twitter and blogs have helped OPPD get through a difficult winter full of weather-related outages and service interruptions. "Even when the power is out, customers can receive instant messages over cell phones and laptop computers, so

they can report problems and get answers," said Jones.

The caveat is that once a business opens two-way communication, it must be prepared to respond to its customers. "Follow through is very important. If customers go to the trouble to contact you, they have to see some action," Jones advised. "If OPPD gets twittered about a problem, the person has to get a call back. Lights out? Get a truck there."

But the effort is worth it, Jones believes, pointing to a noticeable reduction in customer complaints since OPPD began using social media. Whether it means making energy-efficiency training available at any time of day or networking with customers to resolve outages, Omaha Public Power District will continue to test out new ways to engage customers. ⚡

Want to know more?

Visit www.wapa.gov/es/pubs/esb/2010/apr/apr102.htm

REC solicitation

from page 4

participant's needs, as defined in the IAs. Vendors must demonstrate a history of fulfilling contracts to deliver specified products and agreed pricing.

REC contracts should be ready for signing by Sept. 30, 2010. Western will coordinate with the requesting agency to ensure that the contract meets their require-

ments. Although the contracts are between Western and the REC supplier, participants pay the supplier directly.

For more information

Western presented a webinar March 3 to answer questions about the 2010 solicitation, and more than 30 representatives from Federal agencies and Western customers attended. If you were not able to participate, you can

download the PowerPoint presentation (2.3 MB ppt).

Contact Mike Radecki, REC purchase project manager, at 406-247-7442, for questions about the purchase. See EPA Act 2005/EO 13423, to learn more about Federal goals and regulation applying to your agency. ⚡

Want to know more?

Visit www.wapa.gov/es/pubs/esb/2010/apr/apr103.htm

Technology spotlight *from page 5*

Historically, evaporative coolers were prone to scaling due to mineral deposits and mold growth, which can block and damage the unit. Running purge cycles at controlled intervals and designing units to keep solids in solution until the water exits the core are successfully controlling scaling in newer models without increasing water consumption. Mold growth has been reduced by using mold resistant materials and by applying biocide treatment in the manufacturing process.

Cost, payback

Hybrid evaporative/DX systems have greater first cost than standard air-conditioners.

The increased first cost and savings are site and equipment specific, but payback on investment can be in the range of one to five years.

Ventilation benefits

Most evaporative cooling systems can deliver 100-percent outside air, improving indoor air quality without an energy penalty. Energy savings can be particularly large in facilities with high ventilation requirements, such as commercial kitchens, laboratories and assembly and conference spaces.

Other considerations

With evaporative cooling taking much of the load, the DX compressor of a hybrid unit can often be smaller. This allows electrical service to the unit to be

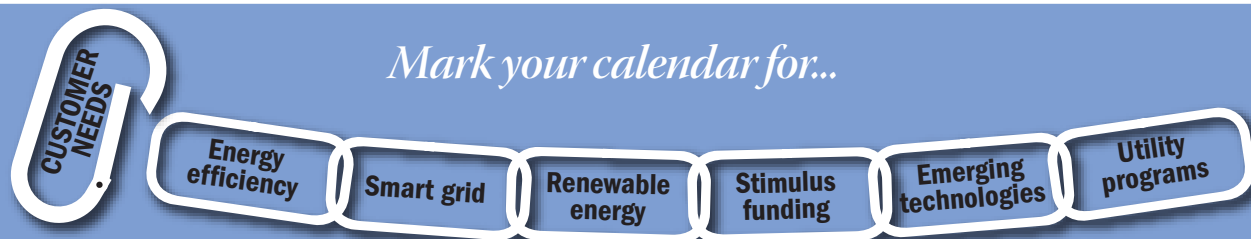
sized for lower amps, possibly reducing installed costs.

More information

- *Assessment of Market-Ready Evaporative Technologies for HVAC Applications* New Buildings Institute, 2006
- "Going 'Back to the Future' of Evaporative Cooling" John Dieckmann, Kurtis McKenney and James Brodrick, ASHRAE Journal, May 2009
- *SWEET/WCEC Workshop on Modern Evaporative Cooling Technologies* Southwest Energy Efficiency Project and U.C. Davis Western Cooling Efficiency Center, Sept. 14, 2007 ⚡

Want to know more?

Visit www.wapa.gov/es/pubs/esb/2010/apr/apr104.htm



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